WHAT IS CLAIMED IS:

1. A deposited-film formation method comprising the steps of: providing a discharge electrode in a vacuum vessel equipped with exhaust means; supplying a hydrogen gas and a raw material gas for forming a deposited film which contains at least an Si element; generating plasma from the material gas by supplying high frequency electric power to the discharge electrode; and forming a deposited film on a substrate in the vacuum vessel by plasma CVD,

wherein an auxiliary electrode is arranged in plasma in the vacuum vessel, and a periodically changing voltage is applied to the auxiliary electrode without causing a discharge to form a deposited film.

2. The deposited-film formation method according to claim 1, wherein a voltage applied to the auxiliary electrode has a maximum amplitude of 80 V or less.

3. The deposited-film formation method according to claim 2, wherein the maximum amplitude of the voltage is 20 V to 80 V.

4. The deposited-film formation method according to claim 2, wherein the maximum amplitude of the voltage is 20 V to 60 V.

5. The deposited-film formation method according to claim 1, wherein when the periodically changing voltage is applied to the auxiliary electrode, a voltage lower than the potential of plasma from the material gas is applied only in a certain period in at least one cycle of the periodically changing voltage.

6. The deposited-film formation method according to claim 1, wherein the plural auxiliary electrodes are arranged at least in a flow direction of the material gas.

7. The deposited-film formation method according to claim 1, wherein a frequency of the high frequency electric power supplied to the discharge electrode is 10 kHz to 500 MHz.

8. The deposited-film formation method according to claim 1, wherein a frequency of the high frequency electric power applied to the auxiliary electrode is equal to or higher than 100 kHz.

9. The deposited-film formation method according to claim 1, wherein the auxiliary electrode is formed from an edgeless and small electrode having a small area facing a substrate in the vacuum vessel.

10. The deposited-film formation method according to claim 1, wherein the auxiliary electrode is formed from a round bar which has a small diameter and which is made of a high strength material of a high melting metal.

11. A deposited-film formation method comprising the steps of: providing a discharge electrode in a vacuum vessel equipped with exhaust means; supplying a hydrogen gas and a raw material gas for forming a deposited film which contains at least an Si element; generating plasma from the material gas by supplying high frequency electric power to the discharge electrode; and forming a deposited film on a substrate in the vacuum vessel by plasma CVD,

wherein an auxiliary electrode is arranged in plasma in the vacuum vessel, a periodically changing voltage is applied to the auxiliary electrode so that a voltage lower than the potential of plasma from the material gas is applied only in a certain period in at least one cycle of the periodically changing voltage, thereby forming a deposited-film.

12. A deposited-film formation method comprising the steps of: providing a discharge electrode in a vacuum vessel equipped with exhaust means; supplying a hydrogen gas and a raw material gas for forming a

deposited film which contains at least an Si element; generating plasma from the material gas by supplying high frequency electric power to the discharge electrode; and forming a deposited film on a substrate in the vacuum vessel by plasma CVD,

wherein an auxiliary electrode is arranged in plasma in the vacuum vessel, a high-frequency power of 10 kHz to 500 MHz is applied to the discharge electrode, and a high-frequency power of 100 KHz or higher to the auxiliary electrode, thereby forming a deposited-film.

13. A deposited-film formation method comprising the steps of: providing a discharge electrode in a vacuum vessel equipped with exhaust means; supplying a hydrogen gas and a raw material gas for forming a deposited film which contains at least an Si element; generating plasma from the material gas by supplying high frequency electric power to the discharge electrode; and forming a deposited film on a substrate in the vacuum vessel by plasma CVD,

wherein an auxiliary electrode is arranged in plasma in the vacuum vessel, a periodic electric field is applied to the auxiliary electrode, and only electrons are energized without energizing ions to discompose a hydrogen gas and generate hydrogen radicals, thereby forming a deposited film.

14. A deposited-film formation apparatus for forming a deposited film on a substrate in the vacuum vessel by plasma CVD, comprising: a vacuum vessel equipped with exhaust means; raw material gas supply means for supplying a raw material gas for forming a film and a discharge electrode for making plasma from the material gas which are provided in the vacuum vessel; and electric-power introduction means for applying high-frequency electric power from a high frequency power source to the discharge electrode,

wherein an auxiliary electrode is arranged between the substrate in the vacuum vessel and the discharge electrode provided with facing the substrate, and voltage application means is provided which enables application of a periodically changing voltage without causing a discharge.

15. The deposited-film formation apparatus according to claim 14, wherein the voltage application means applying a voltage to the auxiliary electrode is configured so as to apply a voltage having a maximum amplitude of 80 V or less.

16. The deposited-film formation apparatus according to claim 15, wherein the voltage application means is configured so as to apply a voltage having a maximum amplitude of 20 V to 80 V.

17. The deposited-film formation apparatus according to claim 15, wherein the voltage application means is configured so as to apply a voltage having a maximum amplitude of 20 V to 60 V.

18. The deposited-film formation apparatus according to claim 14, wherein the voltage application means applying a voltage to the auxiliary electrode is configured so as to apply a voltage lower than potential of plasma from the material gas only in a certain period in at least one cycle of the periodically changing voltage.

19. The deposited-film formation apparatus according to claim 14, wherein a plurality of auxiliary electrodes are arranged at least in a flow direction of the material gas.

20. The deposited-film formation apparatus according to claim 14, wherein the high frequency power source supplies a high frequency electric power having a frequency of 10 KHz to 500 MHz to the discharge electrode.

21. The deposited-film formation apparatus according to claim 14, wherein the voltage application means applying a voltage to the auxiliary electrode is

configured so as to apply a high frequency electric power having a frequency of 100 KHz or higher.

22. The deposited-film formation apparatus according to claim 14, wherein the auxiliary electrode is formed from an edgeless and small electrode having a small area facing a substrate in the vacuum vessel.

23. The deposited-film formation apparatus according to claim 14, wherein the auxiliary electrode is formed from a round bar having a small diameter which is made of a high strength material of a high melting metal.

24. A deposited-film formation apparatus for forming a deposited film on a substrate in this vacuum vessel by plasma CVD, comprising: a vacuum vessel equipped with exhaust means; raw material gas supply means for supplying a raw material gas for forming a film and a discharge electrode for making plasma from the material gas which are provided in the vacuum vessel; and electric-power introduction means for applying high-frequency electric power from a high frequency power source to the discharge electrode,

wherein an auxiliary electrode is arranged between a substrate in the vacuum vessel and the discharge electrode provided with facing the substrate, wherein

voltage application means is provided which enables application of a periodically changing voltage without causing a discharge, and wherein the voltage application means applying a voltage to the auxiliary electrode applies a periodically changing voltage to the auxiliary electrode so that a voltage lower than potential of plasma from the material gas is applied only in a certain period in at least one cycle of the periodically changing voltage.

25. A deposited-film formation apparatus for forming a deposited film on a substrate in the vacuum vessel by plasma CVD, comprising: a vacuum vessel equipped with exhaust means; raw material gas supply means for supplying a raw material gas for forming a film and a discharge electrode for making plasma from the material gas which are provided in the vacuum vessel; and electric power introduction means for applying high-frequency electric power from a high frequency power source to the discharge electrode,

wherein an auxiliary electrode is arranged between a substrate in the vacuum vessel and the discharge electrode provided with facing the substrate, wherein voltage application means is provided which enables application of a periodically changing voltage without causing a discharge, wherein the high-frequency power source is provided for supplying a high-frequency

electric power of 10 KHz to 500 MHz to the discharge electrode, and wherein voltage application means applying a voltage to the auxiliary electrode is configured so as to apply a high frequency electric power having a frequency of 100 KHz or higher.

26. A deposited-film formation apparatus for forming a deposited film on a substrate in this vacuum vessel by plasma CVD, comprising: a vacuum vessel equipped with exhaust means; raw material gas supply means for supplying a raw material gas for forming a film and a discharge electrode for making plasma from the material gas which are provided in the vacuum vessel; and electric-power introduction means for applying high-frequency electric power from a high frequency power source to the discharge electrode,

wherein an auxiliary electrode is arranged between a substrate in the vacuum vessel and the discharge electrode provided with facing the substrate, wherein electric field application means is provided for energizing only electrons without energizing ions, discomposing a hydrogen gas, generating hydrogen radicals to form a deposited film by applying a periodic electric field to the auxiliary electrode.